The American
CINEMATOGRAPHER
VOL. 3, NO. 3. LOS ANGELES, CAL. JUNE, 1922 TWENTY-FIVE CENTS A COPY
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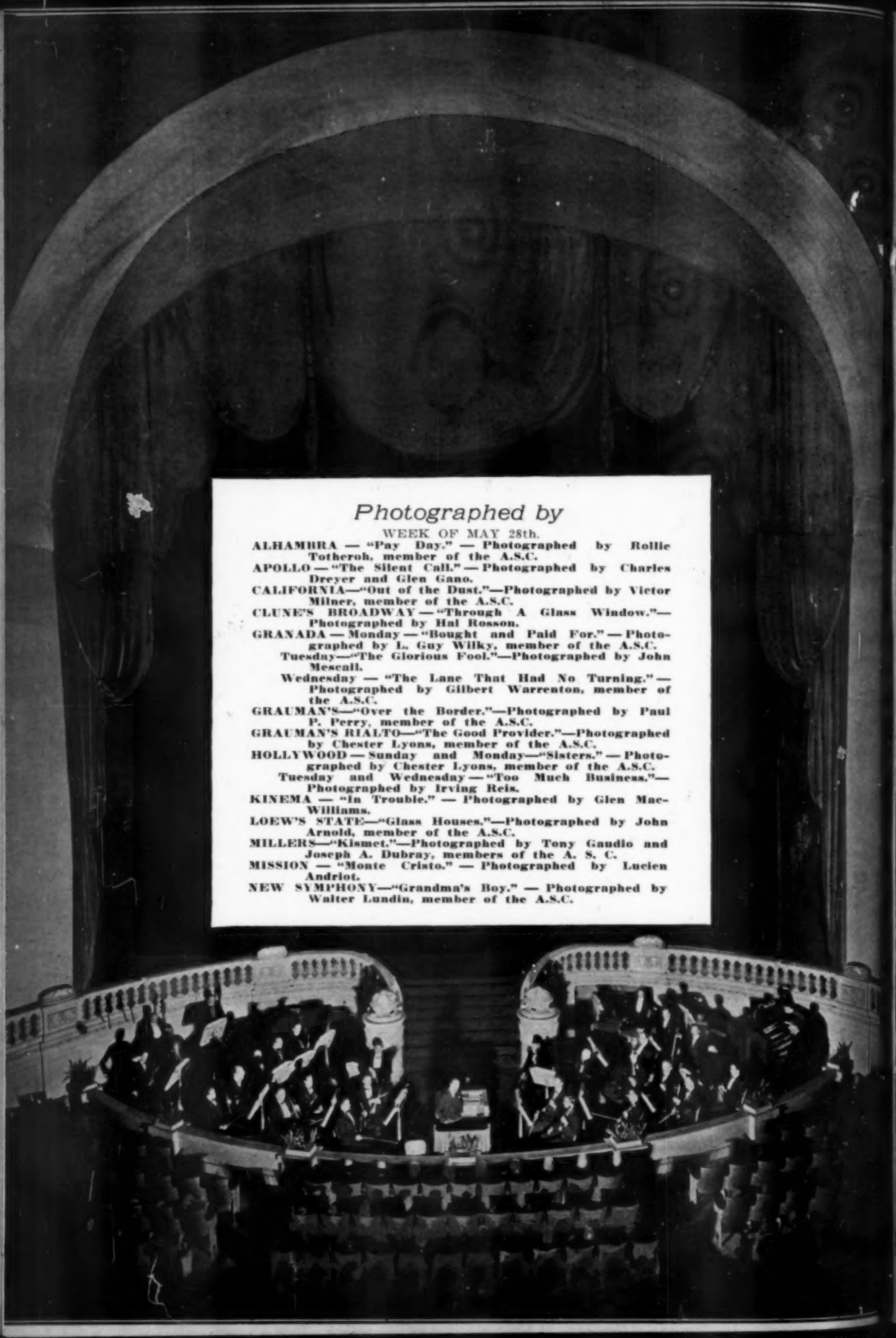
Photographed by

WEEK OF MAY 28th.

ALHAMBRA — "Pay Day." — Photographed by Rollie Totheroh, member of the A.S.C.

APOLLO — "The Silent Call." — Photographed by Charles Dreyer and Glen Gano.

CALIFORNIA—"Out of the Dust."—Photographed by Victor Milner, member of the A.S.C.

CLUNE'S BROADWAY — "Through A Glass Window."—Photographed by Hal Rosson.

GRANADA — Monday — "Bought and Paid For." — Photographed by L. Guy Wilky, member of the A.S.C.
Tuesday—"The Glorious Fool."—Photographed by John Mescall.
Wednesday — "The Lane That Had No Turning." — Photographed by Gilbert Warrenton, member of the A.S.C.

GRAUMAN'S—"Over the Border."—Photographed by Paul P. Perry, member of the A.S.C.

GRAUMAN'S RIALTO—"The Good Provider."—Photographed by Chester Lyons, member of the A.S.C.

HOLLYWOOD — Sunday and Monday—"Sisters." — Photographed by Chester Lyons, member of the A.S.C.
Tuesday and Wednesday — "Too Much Business."—Photographed by Irving Reis.

KINEMA — "In Trouble." — Photographed by Glen MacWilliams.

LOEW'S STATE—"Glass Houses."—Photographed by John Arnold, member of the A.S.C.

MILLERS—"Kismet."—Photographed by Tony Gaudio and Joseph A. Dubray, members of the A. S. C.

MISSION — "Monte Cristo." — Photographed by Lucien Andriot.

NEW SYMPHONY—"Grandma's Boy." — Photographed by Walter Lundin, member of the A.S.C.

Vol. 3 JUNE 1, 1922 No. 3

The American Cinematographer

The Voice of the Motion Picture Cameramen of America; the men who make the pictures.

Board of Editors—J. A. DUBRAY, H. LYMAN BROENING, KARL BROWN, PHILIP H. WHITMAN
SILAS E. SNYDER, Editor

COMING IN JULY

Announcements for July Cinematographer will not be made in this issue as our table of contents arranged for that number may be disarranged by the arrival of some long expected material from the east. If this material arrives in time for the July issue some surprises will be sprung. The American Cinematographer is bidding for national honors and the quality of its offerings will increase from issue to issue.

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RADIO CINEMA — MOVIES MAY SOON BE BROADCASTED.

THE SMALLEST STAGE IN THE WORLD.

EVOLUTION.
By Joseph A. Dubray, A.S.C.

An educational and instructive publication espousing progress and art in motion picture photography while fostering the industry.

We cordially invite news articles along instructive and constructive lines of motion picture photography from our members and others active in the motion picture industry. All articles must be signed by name of writer.

Meetings of the American Society of Cinematographers are held every Monday evening in their rooms, suite 325 Markham Building. On the first and third Monday of each month the open meeting is held; and on the second and fourth the meeting of the Board of Governors.

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Modern Lenses

SECTION TWO

By Karl Brown, A. S. C.

NOTE. — The American Cinematographer gratefully acknowledges the valuable assistance of Mr. M. C. Williamson, of the Wollensak Optical Company, for data and diagrams; and the data supplied by Mr. Henry F. Branstotter of the Hanovia Chemical and Mfg. Co.

A soft focus lens is simply one that is more or less optically imperfect, and the image-quality of any soft focus lens depends upon the nature and degree of these imperfections. Most soft focus lenses depend upon spherical aberration, chromatic aberration, or a combination of the two in various degrees. The usual soft focus image shows a more or less firm main image overlapped

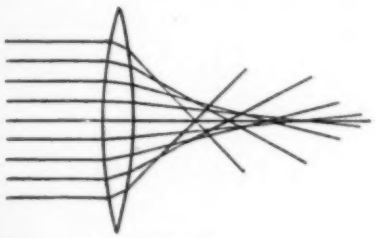


Fig. 1.

and underlaid with a less intense out-of-focus secondary image, the spread and intensity of which can be varied with the diaphram.

1. Spherical aberration is illustrated by figure one. The marginal rays, that is the rays entering the lens near the edges, come to a focus on a plane different from those entering near the axis, or center of the lens. The diagram shows this in a very exaggerated form. It is clear that the elimination of the marginal rays will reduce the error, since they are the rays in error. Thus the aberration may be controlled by varying the size of the stop.

2. Chromatic (color) aberration is due to the fact that light passing through a prism, or modified prism, such as a simple lens, is broken up into colors of the spectrum. This is shown in figure two.

3. A lens uncorrected for color error not only breaks the light up into a spectrum, but brings the different colors to a focus at different planes. This is

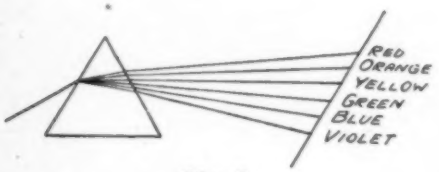


Fig. 2.

shown in figure three. Since the usual negative emulsion is particularly sensitive to the blue end of the spectrum, especially the invisible violet rays, it will be seen that an image in focus for the violet rays will be overlaid by the out-of-focus images of the less actinic colors, thus producing an effect somewhat similar to that shown by spherical aberration. Since the strongest image is formed by light near or beyond the limit of visibility, it follows that a lens uncorrected for chromatic error must be focused by other than visual means. One way is to focus the image to visual sharpness and then rack the lens a stated distance from this point, so as to place the plate on a focal plane of the most actinic rays. The ground glass image now appears out of focus, but the plate is on the plane of the **chemical focus.** The writer finds the most satisfactory way to handle such a lens is by a carefully marked scale.

Of all types of soft focus lenses, there is hardly room for doubt that a single lens, uncorrected for color and spherical error is the most flexible, and best suited for expressing the individuality of the worker. It is also the most difficult to work and not one to be lightly handled. To surely obtain a planned effect with a lens producing an invisible actinic image is an art not to be learned in a day.

The single lens is particularly valuable for motion picture work provided the operator is truly able to handle it. The single glass has but two reflecting surfaces, and its light transmitting power makes its actual intensity considerably higher than the mathematically figured diaphragm marking would indicate. The single uncorrected lens gives a certain quality of image, not found in any other type. The main fault in a single lens

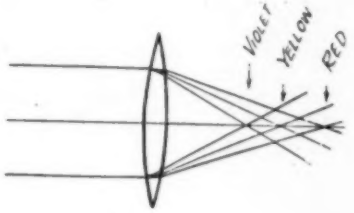


Fig. 3.

for motion picture purposes is distortion, a defect particularly telling in motion picture work where a distorted image is immediately contrasted to anastigmatic scenes. This, of course, holds true only where architectural detail or other exact lines are shown; in close-ups the distortion is negligible.

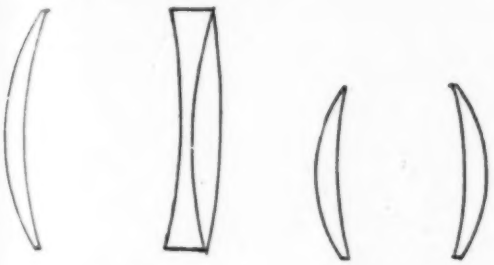
Since this article concerns itself with motion picture work, it will be impossible to go into details about lenses made for still work, for which most soft focus lenses are designed. The Photo Miniature No. 184 describes these very completely.

A representative soft focus lens for motion picture work is the Verito, made by the Wollensak Optical Co. The formula-type of the Verito is distinctive. It might be termed a semi-corrected lens of rectilinear construction. This is an improvement over the single lens, which is not rectilinear.

The lens was calculated by John Wollensak in 1913, and has been produced in two forms, the first commonly designated as "Old Verito" showing a marked degree of chromatic aberration, and the later, or "New Verito,"

corrected so that the visual and chemical foci are virtually the same. This later lens is of the same tpye as the first, but of different structure, using stronger curves, and glass of different refractive index. The Motion Picture Verito is a still further modification of the original formula.

The M. P. Verito is wide open at F. 4., at which apperature it is at it's fullest diffusion. The diffusion lessens as the lens is stopped down, and at F. 11., it is



Regular Verito M. P. Verito

practically sharp. The quality is very pleasing, and has caused the lens to be widely used. Like all soft image lenses, the best results are only to be obtained by a delicate and intelligent handling, still, it is as near fool proof as a soft image lens well can be. There is but one aberration to deal with, and this, as stated, as controlled by the stop. The true art of handling the Verito is in the placing of the focus, and in light, the subject, two points that must be learned by actual experience.

A most unusual lens is the Kalostat, made by the Hanovia Chemical and Mfg. Co. The lens, which was suggested by Dr. T. W. Kilman and Dr. H. D'Arcy Power of San Francisco, is made of quartz. After a series of lengthy experiments, the Kalostat was finally produced in October, 1919, being constructed of synthetic quartz of the desired optical quality.

The quartz of which the Kalostat is constructed is transparent to all the valuable light rays of the spectrum, including the ultra-violet. This feature makes it a very fast lens.

The lens was originally devised for speed, which it has, but it is marketed as a soft focus lens, and must be judged from this standpoint. The softeness is due to the overlapping of the central image by the marginal image of slight intensity, so the degree of diffusion may be regulated by the diaphragm. In this lens the focus must be adjusted at the aperture at which the lens is to be used, as the focus varies with the aperture. The actinic and visual images very nearly, but not quite, coincide. There is a difference of one four-hundredth of the focal length of the lens between the two, so, if so desired, the lens may be focused visually and then racked back that distance to obtain the greatest sharpness.

The distribution of the area of softness in this type of lens depends upon the relation of the curvature of the lens to the plate and field. If the convex side of the lens is toward the plate, the diffusion is evenly distributed, and no area is critically sharp. This is usually the right position for general use. If the lens is reversed, sharp definition in the center, and rapid shading off into a blurring at the edges is obtained, a sometimes valuable effect.

The combination in the Kalostat lens of a high refractive index with a wide range of spectral transmission, produces in the picture a spectral diffusion of unique quality. The result of this phenomenon is a soft focus effect of remarkable quality. The spectral diffusion secured, combines a sufficiency of definition with a softness that permits of very broad handling, a feature not usually found in other lenses.

The quartz lens transmits a much greater amount of actual light than glass lenses. This makes the lens of greater actual intensity than the normal F. would indicate. In a comparative spectrograph, a standard anastigmat does not register light beyond the (ultra-violet) line 365, while the Kalostat registers beyond the line 238. Since this end of the spectrum is the actinic end, the value of the quartz light-transmission is very apparent.

The Kalostat is a single element lens, and is marketed unmounted, being 3/4 in. for 50 mm., 1 in. for 75 mm., and 1-1/4 in. for 100 mm.

The lenses described so far are fairly representative of the field available for cameramen. There are other lenses marketed, which perhaps in absolute fairness should be fully described, but to do so would involve a great deal of repetition, as they naturally fall into one or another of the classes given. The field consists, broadly, of single lenses, uncorrected, doublets, semi-corrected, and rectilinear, and the quartz lens. An anastigmat, with a variable amount of spherical aberration, controllable at all apertures by the operator, is now in preparation by the Graf Optical Co., of South Bend, Ind., and from what the author has seen of the test lenses, promised to be a most valuable lens. This lens will be treated under the heading of anastigmatic lenses, to which class it properly belongs.

(Concluded on Page 12.)

If you are interested in the technical growth of the motion picture industry the best investment you can make is a year's subscription to THE AMERICAN CINEMATOGRAPHER.

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Photographic Problems of an Astronomical Observatory. The Great Telescope on Mt. Wilson Busy Shooting the Cosmos

By Paul W. Merrill

THE business of astronomical research as conducted today makes use of photography to an extent perhaps not generally appreciated. Night after night the great telescopes on Mount Wilson are used for photography only, and much of the solar investigations is carried on by means of photographic records. Visual observations have become the exception rather than the rule.

The types of work are so varied that a great range of photographic problems is encountered. It may be of interest to readers of The Cinematographer to hear briefly of some of these problems in order that they may compare them with the problems of motion picture photography.

Speed.

Fast emulsions are required as many of the objects to be photographed are very faint. Exposures ranging from two to five hours are common and occasionally exposures covering twenty, forty, or even eighty hours are made. It is, of course, highly desirable to cut down these long exposures so that the productiveness of a given telescope and of a given amount of human energy may be proportionately increased. In many observations a limited time only is available and this may be too short to afford a satisfactory result with present photograpic materials. Faster plates would reduce the present exposures and also open the way to many valuable observations which are now impossible. For many purposes increasing the speed of the emulsion would be equivalent to acquiring larger telescopes. Telescopes much larger than the Hooker telescope on Mount Wilson, which has an objective 100 inches in diameter, will present serious mechanical and financial problems, as the moving parts of such an instrument would weight several hundred tons, and the cost would be several million dollars.

It has been many years since any important improvement in the speed of emulsions has been made. The Lumiere "Sigma" and the Eastman "Graflex" emulsions have been used in astronomy but it is doubtful whether the added speed is sufficient to offset the loss caused by their coarse grain. Perhaps the new Eastman "Super-Speed" emulsion recently advertised in The Cinematographer will prove of service. It has not yet been given a satisfactory trial in astronomical work.

Since the eye can perceive in a moment of time an amount of light so small that it requires hours to affect the fastest photographic plate, there is still much room for improvement in photographic materials. There appears to be no inherent impossibility in manufacturing emulsions ten, or even one hundred times as sensitive as those known at present. Astronomers look forward with hope to the discovery of a process in which the familiar and unpleasant relationship between speed and grain does not hold.

Resolving Power.

The ability of the emulsion to show fine detail and delicate contrasts is of essential importance in much astronomical work. Especially in small scale spectrum

photographs many minute features become indeterminate because of the coarse grain of the emulsions. One feels as though he were trying to paint a miniature on a rag carpet. Whenever possible the finer grained emulsions such as "Seed 23" or "Process" are employed. The new emulsions of high resolving power and contrast have recently been tried and appear promising. They are the "News Bromide" and the "Contrast Bromide" made by the Eastman Kodak Company. It is hoped that future discoveries will bring forth a grainless emulsion of reasonably high speed.

Color Sensitivity.

A large proportion of modern astronomical research is spectroscopic in character, that is to say, the various colors are observed separately after having been sorted by a prism or grating. It is, of course, desirable to photograph as large a range of color as possible, hence rapid color-sensitive plates are a matter of much concern.

Investigators have often prepared their own color sensitive emulsions by bathing ordinary plates in solutions of the so-called photo-sensitizing dyes. The dyes most used have been erythrosin and pinaverdol for the green and yellow, pinacyanol for the red, and dicyanin for the deep red and infra-red. As a result of the war all of these are now made in this country and some new ones of promise have been developed.

The war also stimulated improvement of the factory made orthochromatic and panchromatic plates so that the best of these are now much more nearly equal to the laboratory "bathed" plates than they were a few years ago. Among the most valuable of the recent developments are Ilford "Special Panchromatic," an excellent panchromatic plate with the blue sensitiveness partially repressed, being thus to a certain extent a "self-screening" plate, and the experimental green and yellow sensitive "Astronomical" emulsion now being perfected by the Research Laboratory of the Eastman Kodak Company.

It may be of interest to note that nearly all panchromatic emulsions can be considerably improved in speed by a preliminary bath in dilute ammonia.

The demand for color-sensitive emulsions in both scientific and general photography is based upon fundamental optical reasons which should be understood by every photographer. It is probably safe to predict that before long the outdoor scenes in all high class motion pictures will be taken on color-sensitive films.

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The Smallest Stage in the World.

Ritterrath Cold Illumination Permits Photographing of Practically Invisible Objects on a Stage 28/1000 of an Inch Square—Will Reduce Insurance Rates

IF it had not been for a fire in a motion picture theatre in Chicago about six and a half years ago Mr. M. J. Ritterrath, of Los Angeles, might not have set out on his career of research which has resulted in the discovery of a method to eliminate the heat from light and electricity to an extent that the term "cold light" may be applied to it without incurring the danger of an accusation of exaggeration.

Nobody but the National Board of Underwriters knows how many explosions occur in the projection booths of motion picture theatres, for the reason that the audience never knows when an explosion occurs and it has come to be a generally accepted fact that motion picture going is almost the safest entertainment that is given inside of four walls.

Absolute freedom from explosion and fire has, of course, never been claimed by any one for motion picture projection, but that has been the ideal hoped for and, literally, millions have been spent in research to achieve this ideal.

Since that night six and one half years ago, Mr. Ritterrath and his associates have diligently wrought to achieve this ideal, and the invention which bears Mr. Ritterrath's name appears to operate satisfactorily, for now after many demonstrations through practical application, the American Research Engineering Company has been organized to commercialize it.

This organization is now a syndicate, but will shortly become a corporation and operate as a holding company to exploit not only Mr. Ritterrath's "ray cooler," but other appliances and products already perfected and yet to be perfected.

J. C. Monning

F. E. Keeler

M. J. Ritterrath

The members of the American Research Engineering Company are M. J. Ritterrath, John C. Monning and Fred E. Keeler.

From the beginning of his long research Mr. Ritterrath never doubted his ultimate success. He worked with faith and Mr. Monning was at his side almost constantly to advise and encourage, Mr. Keeler being brought in later to add financial strength and commercial stability and freedom.

All of them realized the almost incalculable economic value of a cold light as applied to the cinema in both production and exhibition, but none of them realized until after the later demonstrations that the invention might reach into therapeutics, horticulture, biological research and many widely divergent branches of science.

When he first began studying the problem Mr. Ritterrath predicated his research upon the theory that heat in light was caused by friction in vibration of the blue and ultra violet rays and, by a series of experiments, he found that by straightening out these vibrations he could reduce the heat. Further research determined that success lay along the way of eliminating the infra red rays from any source of light—either electric or sunlight—and by concentrating upon this line, he found his solution.

The infra red ray while very familiar to the optician and the scientist may not be so well known to the lay brother. The infra red ray, therefore, may briefly be defined as designating that part of the spectrum lying outside of the visible spectrum at its red end. They are the heat rays of light. Infra means below. Therefore infra red rays are the red rays that lie "below" the red rays of the spectrum. Here "below" may be expressed as invisible.

Mr. Ritterrath's invention is, therefore, an appliance, built to attach to any projection machine, through which the light from the arc is passed and, in passing, the appliance takes out the infra red or heat rays so that, if desired, the film may be stopped and one frame held in the light indefinitely without any danger of burning, explosion or impairment, and in this process only 3½ per cent of the light is lost. At present if a film be held in the light of the projector 3½ seconds it will explode.

This ray cooler is a cylinder 5¾ x 7½ inches or 8½ x 11 inches. The technical description is not given here at this time because of patent requirements, but will be published in a future issue of **The American Cinematographer** with illustrations.

But it may be said that the cold light is induced by running water in a continuous stream through the ray cooler. It is not the **temperature** of the water, but its **action** which eliminates the heat rays as the light passes through the cooler. The water might be hot or cold, or any other liquid might be used, but water is used because it is cheapest.

Mr. Ritterrath and his associates have, therefore, achieved their first objective—to prevent explosions and fire in projection machines. From this point expansion is simply a matter of evolution through application and experimentation.

Up to this time micro-cinematography has been practically impossible. The field of a microscope is about 28/1000 of an inch square and the concentration of rays from a source of light upon such an infinitesimal stage with its almost invisible subjects simply burned up the subjects before a photograph could be secured.

But with the utilization of a Ritterrath cooler subjects invisible to the naked eye may be photographed as easily as a mob scene and held alive for any length of time desired.

A drop of water that would evaporate in five seconds under the concentrated rays from an ordinary arc may be examined for an hour under the new cold light.

Mr. Ritterrath has a film showing the wonders of a single drop of water and the life in it would amaze the lay brother. In the film many nests of the water mite are shown and may be studied at leisure and in detail. Figure 1 shows a strange, new and unclassified water denizen in that one drop of water which was industriously feeding upon other water creatures unimaginably smaller than himself. The new light, therefore, discovers a new sub-visual world that the scientist may examine at his leisure.

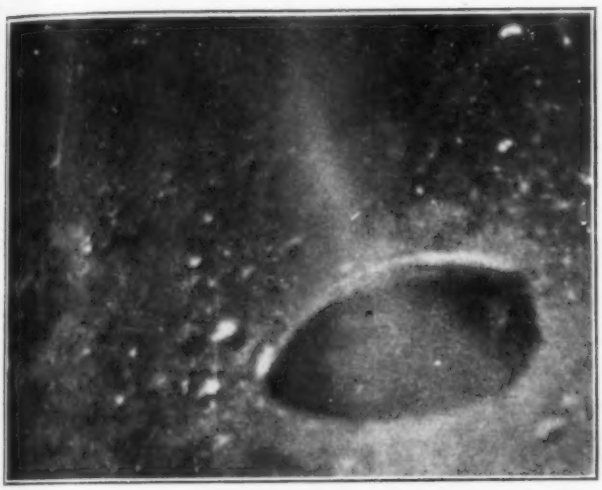
In the study of insect enemies of trees and plants the new light gives hope of finding a way to eradicate

these pests which annually destroy untold millions of dollars' worth of food products.

Dr. Charles Edwards, chief of the Biological Department of the Los Angeles schools, who is just completing an authoritative work on Marine Biology, after several years' research, has co-operated with Mr. Ritterrath in this branch of the work. Very soon Dr. Edwards will direct the filming of the incubation of a chicken, showing the development of incubation from the day the egg is deposited in the incubator to the hatching of the chick. all of which will be shown on the screen.

The new cold light will eliminate the motor generator sets now used in all motion picture theatres and in all studios, for the company can lease the ray coolers at a rate that will be less than one-half the cost of insurance, light and interest on the investment in the motor generator set.

Speaking of his invention, Mr. Ritterrath said: "I believe that the greatest value of the new light will be



A drop of water photographed by the Ritterrath light. Enlarged from one frame of film.

in therapeutics. Cold light eventually will supplant the X-Ray. I have conducted experiments which show that the human body as well as insects can be subjected to the light without danger. Where the X-ray burns, this light does not. By filling the veins with iron, or the various organs with a substance to make them opaque, the physician or surgeon can study the human internal mechanism as long as he wishes, without deleterious effects on the subject.

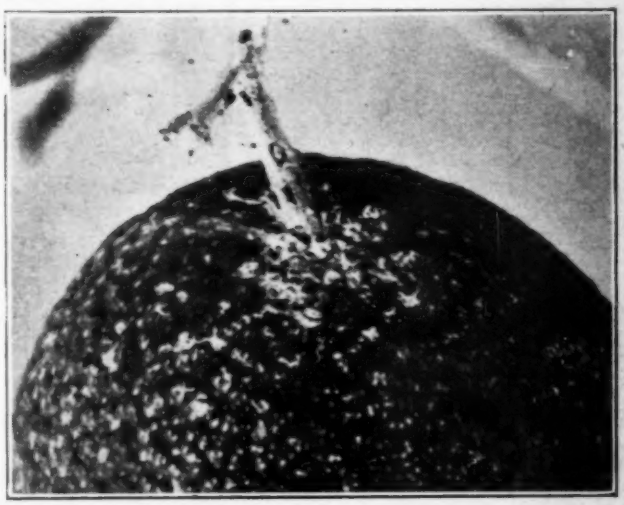
"Our experiments with the red spider, that pest

A mealy bug photographed by the Ritterrath cold light. It is about 1-3000 of an inch in length.

Another inhabitant of the same drop of water. Enlarged from one frame of film photographed by the Ritterrath light.

which costs citrus growers huge sums each year, have come to the point where we will be able to study its habits so closely that we surely will be able to devise some means of eradicating it."

Concurrently with the invention of the ray cooler Mr. Ritterrath and Mr. Monning have perfected a new projecting lamp with but one adjustment. This lamp is equipped with a reflector, something that has never been possible until now, and it can operate with a 6 am-



There are 200,000 mealy bugs on this orange—count 'em. Enlarged from one frame of film photographed by the Ritterrath light.

pere line as against a 60 to 70 ampere line now necessary to get the best results in projection.

The ordinary projection lamp loses all but 22 per cent of the light in projection whereas the new lamp saves 92 per cent of all the light. This difference is so stupendous that the statement may readily be questioned, but a demonstration recently made at Grauman's Million Dollar theatre, in Los Angeles, easily proved the claims of the inventors.

One of the eminent men greatly interested in the work of the American Research Engineering Company is Mr. William E. Drescher, president of the Bosch & Laumb Company of Rochester, New York, manufacturers of lenses, who is so impressed with the new light and

the new reflector lamp that he has placed his laboratories and experts at the disposal of Mr. Ritterrath and Mr. Monning, who will go there very soon to co-operate with the lens makers in producing the most suitable lenses for use in connection with the new inventions.

On their trip east Messrs. Ritterrath and Monning will stop at Chicago to make a demonstration before the National Board of Underwriters which should eventuate in the reduction of insurance rates in motion picture theatres and studios throughout the world wherever the new cold light and the new lamp are installed.

They will also demonstrate the new invention before the experts of the General Electric Company; and in New York, Washington, probably at Yale University, and other places.

While they are engaged in this work Mr. Keeler will be perfecting arrangements for the building of a studio-laboratory in Los Angeles where the ray coolers and projection lamps will be built and where further research will be made along lines already predetermined.

In this institution a microcinematographic department will be in operation and Mr. Monning states that the company already has over 400 subjects ready to be filmed.

Thus does the cinema march steadily on to greater achievements and to Messrs. Ritterrath, Monning and Keeler are due the sincere thanks of all who see in the motion picture a medium for the liberation of mankind from ignorance and limitation.

Max J. Ritterrath was born September 7th, 1886, in Raunen, Rhineland, Germany. He received his education and training in the German Navy. During that time he made a number of notable inventions which were appropriated by the German government. He participated in expeditions to Africa, Asia and South America. Later on he was for several years Navigation Officer with the Hamburg-American Line. It was on one of these transatlantic trips that he met the American girl who later became his wife. He decided to give up his career and came to America in August 1912. He soon became associated with the Willys-Overland Company of Toledo in the Engineering Department. In 1913 he came West to Arizona where he successfully operated a large cotton ranch. After a disastrous fire in 1917 he discontinued the ranching business and settled in Los Angeles. During the war years, because he had only his first citizenship papers, he had to struggle for existence. In 1919, at the first opportunity, he became a citizen of the United States. Great possibilities for development in the technical branch of the motion picture industry appealed to him to such an extent that he made an extensive study in this line and soon saw that one of the greatest needs in this industry was "Cold Illumination." He set to work in 1918 to invent such an apparatus, with limited equipment and practically no funds. Mr. J. C. Monning a personal friend, saw the immense possibilities in this invention and with his keen business ability joined forces with Mr. Ritterrath and ultimately interested Mr. F. E. Keeler, well-known financier and manufacturer, to the extent that the American Research Engineering Company was formed for the purpose of financing and marketing the Ritterrath Cold Illumination Instruments.

Mr. Monning is a native of Cincinnati, Ohio, where he attended public school and the MacMicken University After leaving college, he entered the newspaper profession as translator with the Associated Press and the New York Sun. In 1902 his interest in pneumatic engineering took him to the Farrend Company of Detroit, one of the first American concerns to develop commercially an automatic piano playing device. Several of the early improvements in this field were patents original to him. In 1907 he came to Los Angeles and for several years was associated with the Birkel Company. In 1911 he succeeded in constructing, in company with E. C. Weissmiller, an automatic music roll recording and cutting machine which was the first instrument of the kind made in America to find a market in Europe. In 1913

(Continued on page 15.)

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NEW COLOR TITLES

Crandall and Stevens Laboratories, 1745 Glendale Boulevard, have perfected what they term the Ideal Title Process. William Stevens is the originator of the process by means of which they are able to use actual color photography on still objects. There is no retouching of the film. The coloring is done on the title cards and photographed and the film developed in the usual way. Neither the negative nor the print requires further handling. The effect is two colors with different shades and in either clear cut or with vague shadings as desired. It appears on the screen just as natural as though it were painted there by an artist. Crandall and Stevens are sole owners.

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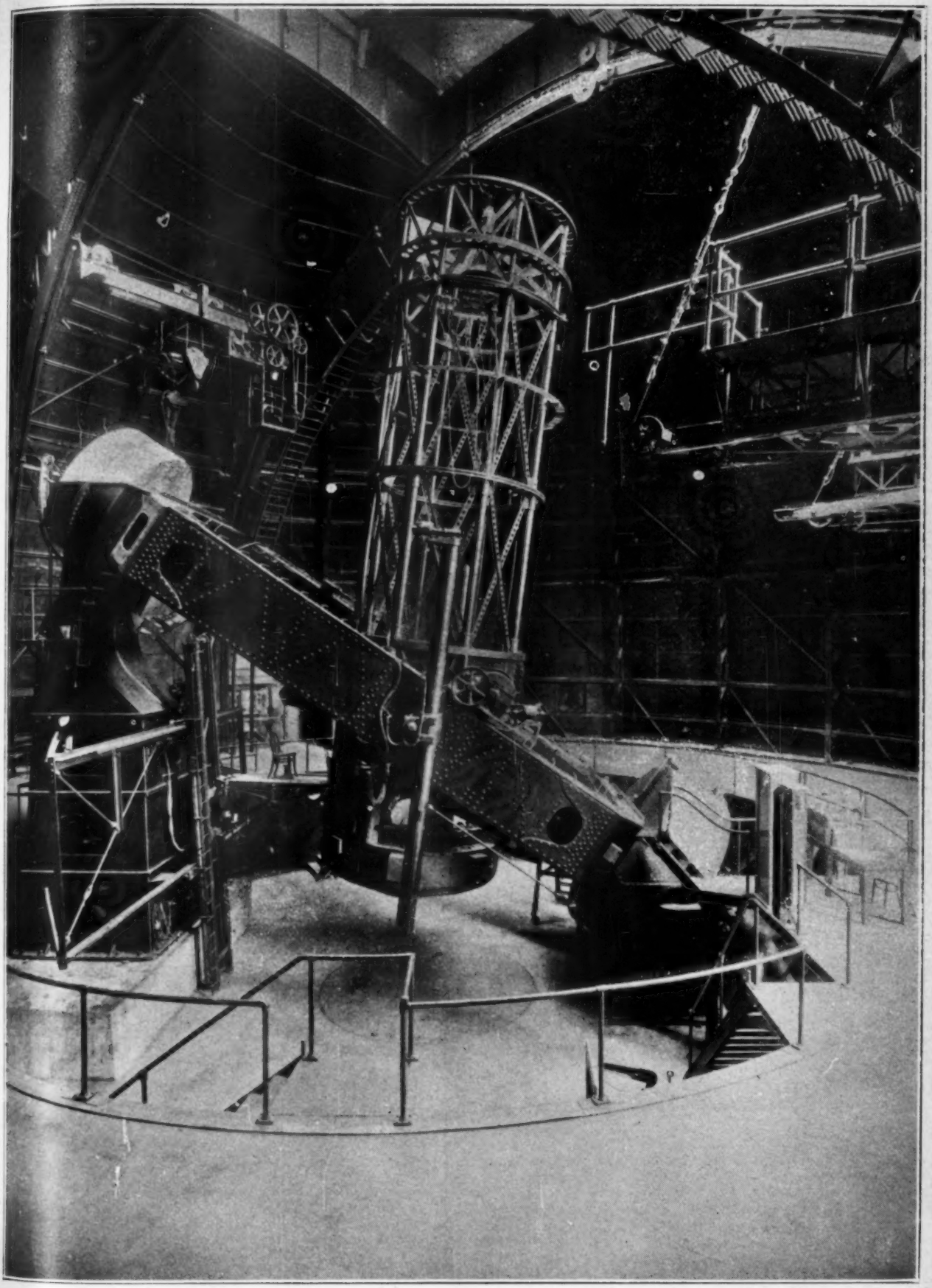

The 100-inch Hooker Telescope of the Mt. Wilson Observatory. The Largest Camera in the World

Modern Lenses

(Continued from page 5.)

Soft focus is by no means limited to soft focus lenses. The regular anastigmat in use may be made to give acceptable soft images by means of various attachments, such as diffusion disks, etc. A diffusion disk, such as the Eastman Diffusion Disk, is a piece of optical glass, flat on one surface, and having the other surface broken up with slight waves or bands, the intensity and frequency of the bands determining the amount of diffusion. A diffusion screen, such as Scheibe's Diffusing Screen, is a fine grained glass screen, which gives a softness of definition something on the order of that obtained with fine chiffon. Chiffon, or guaze, is probably the most widely used device for obtaining soft images with sharp lenses. It is to be had in a great variety of mesh, can be cut for clear centers, made into soft edge vignettes, and employed in innumerable ways.

None of these supplements to a sharp lens can produce the image quality given by a properly handled soft lens. The soft focus lens deserves close study on the part of the cameramen. Soft focus has been cruelly handled on the screen, perhaps unintentionally so. The worst errors into which cameramen have in the past fallen is excessive diffusion, and failure to control "run-around" and halo. Perhaps too close attention to the work of prominent pictorialists has caused this. Motion picture work and pictorial work have perhaps only two things in common. Both use photographic principles, and both are striving for the beautiful. Beyond that the roads part, sharply. An acceptable amount of halo on sun-lit foliage is delightful in a still picture, but an identical picture in motion on the screen would be impossible, due to the twinkling of the appearing and disappearing halos as the foliage moves. A slight run-around does not matter in a still portrait, but on the screen it appears and vanishes as the subject moves and changes high lights, and appears as a living, moving thing. Another point deserving of consideration is the fact that the motion picture is given to the audience as a series of huge enlargements, therefore a very little diffusion in the negative goes a long way. The pictorialist does not have to show his pictures in immediate contrast to sharp scenes; the cameraman must.

Motion picture photography must devolop a school of pictorial representation all of it's own, and the first step in this direction must be a thorough training in the handling of soft image lenses. There is a great difference between the term "soft focus" as understood, and "soft focus" as it should be. It is perfectly possible for the cameraman to produce lovely images without halo, run around, or the least unpleasant or even noticeable "soft focus" effect. The tools are at hand, and have already been beautifully used by certain workers.

To properly handle a soft image lens is a separate art in itself, and is an accomplishment that every cinematographer should acquire. To do this requires a vast amount of care and patience, but the results are well worth many times the effort.

A cutters' convention is in session at the Rothacker Chicago laboratory. Miss Margaret Booth, of the Louis B. Mayer organization, was elected chairlady. She came to the Windy City with John M. Stahl's "One Clear Call." Danny Gray, bringing Marshall Neilan's "Fools First," arrived in time for the opening session. J. T. O'Donohue, representative of R. A. Walsh, qualified as a delegate although he is not a "regular" film editor. He visited the Chicago plant in connection with final changes in the "Kindred of the Dust" negative.

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Industrial Mechanigraphs

By Harry Levey, S.M.P.E.

YEARS ago, when motion pictures had just emerged from the experimental stage and were wholly novel as a means of entertaining the pleasure-seeking public, anything that moved upon the screen was not only considered worth seeing, but worthy of the exclamatory comment that greeted each new wonder. The thing was amazing, and without ocular proof it would be almost incredible. And the mere wonder of the motion picture was quite sufficient, for a while, to make it attractive, regardless of subject or handling. It was enough to see pictures that moved. Why be critical of details?

Today the wonder of the moving picture is wholly forgotten, and hopelessly unsophisticated is he—or she— who cannot pick flaws in productions that only a few short years ago would have been considered flawless. In fact, such productions were impossible to make at the time.

In other words, the public has been educated up to a much higher type of motion picture than that at which it first marveled. And, better—in fact, something better is being **demanded** as a matter of course. And, equally of course, that demand is going to be, and is being, progressively, met.

Of the theatrical type of picture the public, generally speaking, knows a good deal—too much, perhaps, for the peace of mind of the producer whose one aim in life is to keep just one jump ahead of his audiences and who frequently finds his heels tangled with the toes of his fast-growing critics. There is, however, another type of picture that is less well known, but which, it is firmly believed, will shortly find itself the place in public estimation that it so well merits. That is the type that is best known as the "animated mechanical picture," though it has long outgrown that designation.

As a matter of fact, the animated mechanical picture is a direct descendant of the cartoon. Years ago the untiring search for something that would lend novelty and variety to screen showings led to the development of the now familiar animated comic drawings, and it is unnecessary to call to mind the favor with which they were received when first exhibited. It was not long, however, before the crudeness and the obvious limitations of the plan became more or less conspicuous, and the public demand something of the same sort, but much better. So today we have what we called cartoons, but which have every appearance of being actual photographs of utter impossibilities—really wonderful productions made by complex and highly ingenious processes. The old ideas, outgrown, paved the way for something better.

The animated mechanical drawing was at first precisely what the term indicates—a drawing that differed from the ordinary fruit of the drawing board only in that it moved in much the same manner as the machine, or whatever it might be, that was portrayed. This was of course very good indeed, as far as it went, and it supplied something that appealed mightily to many who appreciated the luxury of being taught, in an entertaining way, things that could not otherwise be grasped without more or less distasteful study and application. Later the animated drawings were improved by washing and tinting, just as the ambitious draughtsman of ten washes his exhibition drawings—after which he puts them in frames under glass and keeps them for show pieces.

But, just as the original form of cartoon was forced to give way to the modern, life-like type, the animated mechanical drawing has had to give way to something more advanced—the "mechanigraph."

The term "mechanigraph" is the trade name given to motoin pictures of animated mechanical and technical drawings and models developed and improved by

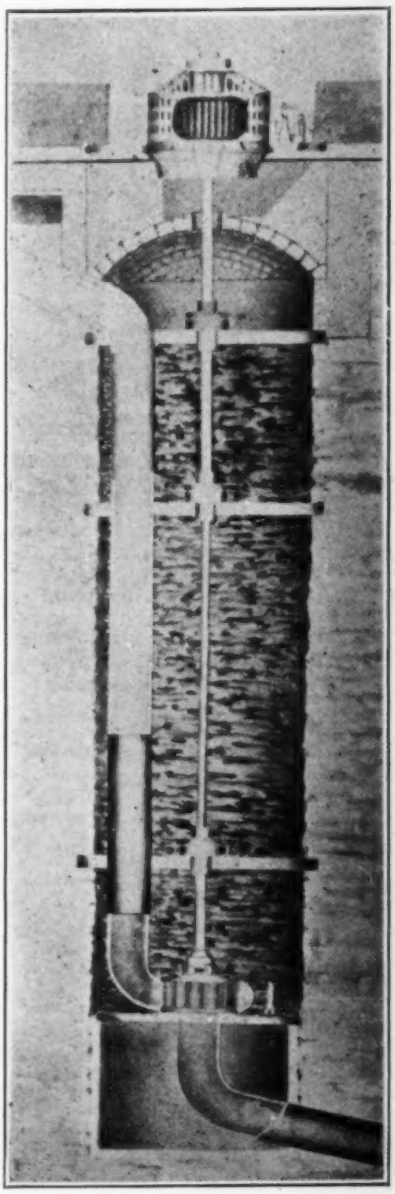

Fig. 1.

the organization with which the author is connected. Mechanigraphs differ from other animated technical films rather in the care and thoroughness with which they are made and the knowledge of subject matter and the engineering skill behind them, in the refinement of details of method and equipment and in the artistic character of execution rather than in the basic procedure of machinery of manufacture. It is the purpose of this paper, therefore, not to explain the basic

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features of mechanigraph production, with which you are already familiar, but only to point out a few of the more conspicuous details of method in which mechanigraphs are different.

OBJECTIVE MATERIAL

Let us consider, first the objective material used under the camera in making mechanigraphs. This consists for the most part of flat working models, supplemented by technical drawings, of the machine, operation, process or idea to be presented. The models are usually made of especially prepared fibre board, drawn, cut out and washed with air brush and by hand so as closely to resemble the real object. One of the secrets of success in mechanigraphs is that where an actual object is presented the picture looks not like an animated drawing of the object but like the actual object itself. Great pains are exerted to attain this result. Even where a series of superimposed animated line drawings would clearly illustrate the lesson to be taught, our mechanigraph engineers are not satisfied, but go to considerable extra trouble to make a picture, say of a metal part, actually to look like metal, of wood to look like wood, and of flowing liquid or gas to look not like symbolic moving dashes but actually like flowing or floating gas. Sometimes it happens that the effect sought in a mechanigraph is not a simulation of the ultimate object itself, as for example, an automobile, but a representation of, say, the plan or drawing. Recently we prepared a mechanigraph whose purpose was to simulate a drawing of certain features of the car, and the resultant picture on the screen was, through the instrumentality of an animated line drawing white or black, of strong contrast in the photography, of extreme under printing and of blue toning, a striking simulation of an animated blue print.

To increase similarity to the original as well as to facilitate execution, the actual original objects themselves, or parts of them are wherever possible used in the mechanigraph. One of the first mechanigraphs was of a machine which makes hooks and eyes. The model of the machine was made of fibre board but the wire, the hooks and the eyes were the real articles, taken from the actual machines at various stages of manufacture.

As another effort toward true representation, it might be worthy of mention, merely as an example of attention to detail on a rather large scale, that a graduate mechanical engineer, the author of several text books on engineering and who has been technical editor of engineering periodicals, plans and supervises the making of mechanigraphs, while a paint and brush artist, whose only concern in life is to make his pictures true representations, handles the coloring and shading and free handwork. The combination of two such forces comes pretty near to the attainment of an ideal result.

Perhaps it is a little curious that there is very little that is new in the way in which mechanigraphs are made. On the contrary, effects are produced by resorting to all the well-known methods. Of course almost every new job calls for some little ingenuity in treatment, and numerous little schemes have been worked to overcome individual difficulties. But, generally speaking, there is no hard and fast process or method. One job is handled in one way, and another in a different way. The process is bent to the job—not the job to the process. The net result is that there is as much variety in the screened results as there is in the subjects; the subject is not sunk in the process.

CAMERA WORK

The camera work on mechanigraphs is more often than not done on stop motion, though not exclusively When a more realistic or graphic result can be obtained through the performance of the objective and photographing it at normal speed or at a speed which makes possible regular cranking of the camera, such is the method employed.

In general, no set methods are employed in producing mechanigraphs. Whatever device or procedure will contribute best to the result desired is used. If actual relief models suit better for a given purpose and will more closely represent the original or more graphically teach the lesson than flat models, if shooting horizontally will result in a better picture than shooting vertically, or if combining straight photography and animation will give better success than using either singly, such is the procedure followed.

SUBJECT MATTER

The subjects which lend themselves to presentation by mechanigraphs are unlimited. The simplest forms are those demonstrating the operation of machinery which is either too much hidden and inaccessible or too complex or too rapid or too slow or too large or small for picturization by straight photography or which will not operate when opened up to the view of the camera. A recently made mechanigraph showed an entire unit of hydro-electric generation at Niagara Falls (Fig. 1). The power house in which the generators are placed is on a level with the river above the falls, and the turbines which drive the generators are just above the level of the river below the falls—that is, nearly two hundred feet below the generators. Drive is through a long vertical shaft reaching from turbine to generator through a pit cut in the rock, and the penstocks, which carry the water to the turbines, run down through the pits. Obviously it is impossible to actually photograph anything but the power house and its contents. The mechanigraph, however, being blissfully ignorant of such limitations, makes a sharp cut, so to speak, through the rock from top to bottom of the pit and lays bare the whole system. More—it slices off exterior parts that hide interior workings. On the screen the whole unit and all its activities are visible—the water from the canal rushing down the penstock to the turbine, the turbine spinning under the impulse, the long shaft transmitting power to the generator and even the generator armature itself turning in its field. The appearance of the job is true to life, as nearly as it is possible to make it—so true, in fact, that one skeptic asserted, with a shake of his head, that he did not believe it was really a photograph, for he did not see how it could be done.

We have succeeded in making water flow on the screen in much the way water appears to flow in reality. That is, the observer sees that a transparent body is in motion, but there are no visible lines or streaks to help his eye to deceive his brain. The flow of gases is shown in the same way, without the use of arrows, dots and dashes or other arbitrary symbols which savor of the drawing board and take away from the appearance of reality. Smoke and steam look like smoke and steam. Clouds and lightning are clouds and lighting, and not caricatures. Even the afterglare of a lightning flash glows on the screen.

In electrical work, such as was embodied in a picture showing the principle of the induction motor and its revolving magnetic field, it is of course necessary to assume that electricity looks like something and that magnetism is visible. It is possible, however, to do this and still keep away from an excess of conventionalism, with the result that the screen shows the theory of the motor in a way that appears realistic. This particular picture brings out clearly and understandably principles that are extremely difficult to grasp by the ordinary text-book method.

The same methods are employed in showing the operation of the vacuum gasoline feed system, for instance. The somewhat complex action of vacuum and atmospheric pressures are clearly brought out, the operation of the valves, the flow of liquid throughout the whole system, and, in fact, every detail. The effect is the same as if the system were split open but still continued to operate.

In a general way, it may be said that the mechanigraph consists of a base drawing upon which the mov-

(Continued on page 18.)

The Smallest Stage in the World

(Continued from page 10.)

he again became associated with the Birkel Company from which concern he resigned to organize the American Research Engineering Company for the purpose of placing on the market the "Ritterrath Cold Illumination Instruments" and microscopic pictures.

Mr. F. E. Keeler, financial organizer of the American Research Engineering Company, is a man of many activities among which are: President of the Mason City Tile Co., one of the largest in the world; Vice-President of the Citizens Trust and Savings Bank of Los Angeles; President of the Globe Petroleum Co.; President American Clay Co.,; President Empire China Company, of Burbank, etc. He was formerly president of the First National Bank of Mason City, Iowa, but resigned when he came to Los Angeles to make his home. He sees in Los Angeles the industrial metropolis of the Pacific and has no doubt that the American Research Engineering Company will develop into one of the largest and most important of America's industries.

Du Par an A. S. C.

E. B. Du Par, with a record of seven years active work at the camera to conjure with, was elected a member of the A. S. C., February 20, 1922.

Mr. Du Par's present work is at Warner Brothers' studio, filming Wesley Barry. He is a graduate of Keystone, having cinematographed on that lot for two years.

Other connections have been two years with Fox Comedies and a season with Jack White Productions.

Mr. Du Par's work at the camera stamps him as being of A. S. C. stature and his future will be watched with interest.

A list of Mr. Du Par's pictures is not just now available, but will be printed later.

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Standardization of Positive Print Density

By Watterson R. Rothacker

LITERAL density standardization of all prints finding their way on to the theatre screens probably never will become a fact. One might as well expect a standardization of color tones in all the paintings created by all the artists who wield a brush, or a standardization of the phraseology of all literature.

A print that would please Marshall Neilan or D. W. Griffith might not be of the same density that John M. Stahl or Rex Ingram would elect for the expression of his art.

Literal density of all prints would have to start with the negative—with the light, the director and the cameraman.

But the theatre owners and their patrons have a right to expect uniform density with respect to all the scenes in all the prints from an individual negative—so that when the picture is screened it will be of uniform illumination and please the eye.

In order to more or less approximate standard density of motion picture prints it is first of all necessary to establish a standard for development—using some arbitrary standard such as may be produced by an emulsion tester, or other device for making a positive ranging in density from opacity to approximate clearness.

When such a standard positive shall have been obtained—which, of course, will have to be worked out in connection with test prints from picture negatives—it is next necessary to devise a method of time development, either by hand or machine, which will invariably produce positives equivalent in density and degree of contrast to this standard, when such positives shall have been given like exposure from some standard of illumination.

Of course, the timing of separate negative scenes will always depend more or less on the personal judgment of the various individuals, but with a standard development—which may be nearly enough approximated by almost numberless means—more nearly uniform prints can be obtained in spite of such personal opinions than are obtained at present.

The personal opinions and tastes of laboratory persons at present enter into the matter of print density to a degree greater than is conducive to the best interests of the industry. Cannot the laboratory workers get together on the question of approximate density standardization? If they cannot get together among themselves of their own volition the producers or the distributors or the exhibitors should demand it.

A way NOT to achieve density standardization is through the use of various processes to which some exchanges subject prints after they are received from the laboratory.

To standardize the density of positive films and to bring about a uniform result on the screen it is not alone necessary to standardize density in the laboratory. Of vital importance is the element of projection. As a matter of fact, even if the density of the print were regulated to a mathematical 100% perfection, all of the beneficial results obtained through careful laboratory work would be lost in the projection booth, unless we have standardized projection to back up standardized print density.

Standardization of density by no means depends on one factor alone. The laboratory having fulfilled its mission carefully—timed, tested and balanced out each and every scene—cannot and does not control the result on the screen itself. It is not only necessary to have each and every unit responsible for the projection of the film on the screen operate perfectly, but the units must also operate perfectly in co-ordination with one another in order to obtain that perfect result already put into the print by the laboratory.

A great factor is the quality and quantity of light in proportion to the throw. If the quantity of light has been properly regulated, a sufficient amperage being utilized, the quality of the light itself is a vital factor in maintaining the proper density on the screen. If the size of the screen has not been established in accordance with the distance that it is from the projection machine, we again encounter difficulty unless our quantity and quality of light have been adjusted to a standardized print.

The screen itself has to be considered as being one of the determining factors entering into perfect results, in maintaining proper densities.

If the quality and quantity of light have been adjusted in the proper manner to both the distance of the screen from the machine and to the size of the screen, and then there is a screen of high reflecting value, it will be found that the throw back, or reflection, of light will preclude the standardized ultimate screen result sought for, unless we have taken into consideration the fact that we are dealing with a highly reflecting screen and adjust all other elements accordingly. In other words, our projection is to be handled slightly different where we have a reflecting screen as against any other screen and again must be handled differently where we have a pure white screen as against a screen having more blue in it. Also must be considered the kind of shutter with which the projection machine is equipped, whether it is a two or three winged shutter or perhaps some other kind.

The kind of carbon that is being used in the machine is a very vital matter. The speed at which the film is projected will tend to change the result and last but not least is the lens on the projection machine itself. Unless it affords the proper light value it will kill all the benefits obtained by the proper adjustments, by the proper co-ordination and by the proper consideration of each and every one of those elements as a complete unit.

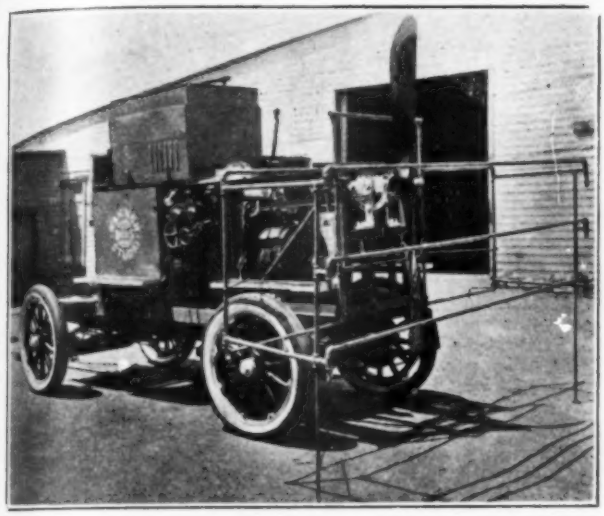
So, to summarize, while a great stride toward standardization of print density can be made directly through the laboratory, yet the fact remains that proper standardization is dependent upon the strength of the chain between the Eastman Kodak Company and the eyes of the audience, which chain is comprised of these links; raw stock, negative exposure, negative developing, proper printing, proper exchange processing, proper projection with standardized throw, light and screen—and, after all, a chain is no stronger than its weakest link.

Mr. O. E. Jones writes **The American Cinematographer** requesting the names of the cinematographers who filmed "Orphans of the Storm" and who were not given screen credit by Mr. Griffith. These men were Hendrick Sartov and Paul Allen and it may be added that they did a workmanlike job of artistic and constructive cinematography which should recommend them to the profession as "workmen that need not to be ashamed.

A Sand Machine

This is a sand machine built by F. Nicholas Murphy, member of the E. I. E. S., in charge of the electrical department Warner Bros.' Studio. It is a combination of a Chalmers Master Six motor of 56 h. p.; 2600 R. P. M., and a wind machine with 7 foot blade, 4 foot, 6 inch pitch; 2500 R. P. M., at high speed. The guard is made of ¾ inch iron pipe.

Generator-110 volts; 300 amperes; 1300 R. P. M.;



chain drive. It is equipped with ammeter, volt meter, automatic circuit breaker and switch. Independent work light from battery service.

Under full sail this machine kicks up a sand storm like a tornado in the Sahara Desert. Universal is using the machinte to make Santa Anas for desert pictures.

Motion Picture Nomenclature

(Continued from last issue.)

STEREOPICON—A lantern for projecting transparent pictures; i. e., lantern slides, often a double lantern for dissolving.
STILL—A picture without movement; e. g., a picture from a single negative.
TAKE-UP (noun)—The mechanism which receives and winds the film after it passes the picture aperture.
TAKE-UP (verb)—To wind up the film after it passes the picture aperture in motion picture apparatus.
THROW—See "Projection Distance."
TILT—To rotate a motion picture camera parallel to the direction of film motion and in a vertical plane through the optical axis.
TINTING—Coloring a film by dyeing the gelatine side of it.
TONING—Coloring a film by chemical action on the silver image.
TRICK CRANK—See "Single Picture Crank."
TRICK PICTURE—A motion picture intended to give the effect of action other than that which really took place.
TRAILER—That piece of blank film attached to the end of a picture series.
VISION—A new subject introduced into the main picture, by the gradual fading-in and fading -out of the new subject, as, for example, the visualization of a thought.
WORKING DISTANCE—The distance between an object and the nearest face of a lens forming an image of the object.

Photographed by

(Continued from Page 2.)

PARAMOUNT—Monday—"Find the Woman."—Photographed by Ira Morgan, member of the A. S. C.
Tuesday and Wednesday — "The Idle Rich." — Photographed by Arthur Martinelli.
SUPERBA—"Step On It."—Photographed by Chas. Kaufman.
TALLY'S—"Reported Missing." — Photographed by Jules Cronjager.
WILSHIRE—Sunday — "When Romance Rides." — Photographed by Gus Peterson, member of the A.S.C. and Wm. Edmund.
Monday—"The Fourteenth Lover."—Photographed by John Arnold, member of the A.S.C.
Tuesday—"His Back Against the Wall."—
Wednesday—"Nancy From Nowhere."—Photographed by George Folsey.

Radio Cinema

A Washington Dispatch to the L. A. Times.

Motion pictures now may be transmitted by radio from a central broadcasting station into the homes of the people, or happenings on the other side of the world may be flashed into newspaper offices, notorious criminals may be exhibited in one central station and their likeness shown to the police in every city, town and hamlet of the world instantaneously.

This announcement came today from the laboratory of C. Francis Jenkins, who for more than twenty years has been working on this idea, along with other motion-picture inventions. He now holds the Elliott Cresson gold medal, awarded by the Franklin Institute of America, as the originator and inventor of the motion-picture machine.

Inspiration in Air.

Though he has been working for years on the transmission of picture by wireless, it so happened that the solution of the problem came to him while flying in his airplane over Mount Vernon several weeks ago. He went immediately to his laboratory and experiments made proved the solution which occurred to him while in the air. The great obstacle to its perfection was in correcting errors in the new prismatic rings. Always in the manufacture of these rings, of which he is the inventor, there was an error which for some reason or other could not be eradicated. The solution that he has worked out is to take two of the prismatic rings, one with a plus error and the other with an equal minus error, to give the zero of perfection necessary to accomplish the results which he announced today.

Known to Science.

Besides the prismatic rings, which furnish the real secret of the new method of broadcasting pictures, the other instruments have been known in the scientific and technical world for years. There is a light-detecting box which takes the picture through a lens in front of the prismatic rings, and as the light rays pass through, it sends them out through the air, just as the voice is sent by the carbon transmitter. On the receiving end there is an ordinary telegraph instrument with a mirror affixed to it. The light wave causes this instrument to vibrate, and the mirror sends the light on through a "light valve," which is nothing more than a glass tube, filled with carbon bisulphide, and wound with wire, much after the fashion of the tuning coil now used in wireless.

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Industrial Mechanigraphs

(Continued from page 14.)

ing parts are so mounted as to be capable of their normal movement and action. In the matter of materials, as in methods, there is no set rule. Paper, cardboard, fibre board, sheet metal and other materials are used as occasion may demand. If we can use an actual object to better advantage than a picture of it, we use the object. For instance, in making a mechanigraph of a power-driven tire pump, we used a thin section of an actual automobile tire instead of making a drawing. The observer does not know where the drawing leaves off and actually begins.

Another unique and novel result attained by the mechanigraph process is the ability to place activities and objects of a mechanical nature in the proper environment and to show them under natural and proper conditions, just as the stage and the photoplay have been able to do in their field. Thus mechanigraph representations of the first steam engine and the early forerunners of the bicycle. Show these mechanical inventions not only in actual use but in their proper early nineteeth century landscape setting. And so in the same series, the quaint Dutch wind wagon fitted with sails was shown being driven before the wind on the sands of the sea shore, while the first motorcycle chugged through the street of a foreign village in the garb of 1880. Thus are combined in the mechanigraph the talents of the scenic artist and the engineer.

Mechanisms far less mechanical are equally well adapted to treatment by mechanigraph. The human body, its parts and the performance of its various functions are as easy to present as machines made of steel and iron.

The mechanigraph is destined to become a most valuable aid in the teaching of medicine, surgery, dentistry and allied sciences, as supplemental to actual photographs of anatomical structures and of surgical and dental operations. No matter how clear and sharp and well done a straight picture may be, many aspects can be more clearly and graphically presented in mechanigraph, and usually what is performed on the operating table or in the dentist's chair is far from open, clear and readily understandable. More often than not the actions and parts to be shown are hidden in other parts, impossible to light and concealed with blood. The mechanigraph is able to make them clear, and easily and accurately followed.

Microscopy will profit immeasurably by mechanigraph treatment. Straight microcinematography is at best only fairly successful in portraying the subject matter. Cross-section mechanigraphs, many times enlarged over the extreme limits of the microcinematograph and many times more graphic and clear, are able to give microscopic subjects and activities a new meaning upon the screen.

Physics, chemistry, mechanics and other phases of mathematics, biology, astronomy and architecture are but a few pedagogical subjects selected at random of the many the teaching of which may be enhanced by this medium.

The mechanigraph process finds its readiest application in commercial and industrial films. Their capacity for the development of microscopic studies, for example, find commercial expression in explaining how paint, which is revealed under enlargement to consist of long fibres holding the substance together, is absorbed into the pores of wood or holds on to the rough surface of what appears to the unaided eye as polished metal, or how bacteria develops in fruit and vegetables canned improperly and how the proper type of jars and rubbers will prevent the development of the destructive germs.

Dull, uninteresting statistics and diagrams, plans and organization and policy charts can be brought to life by mechanigraphs a new, powerful and efficient medium which is as far advanced beyond ordinary cinematography for attaining certain desired results as the ordinary cinematograph is advanced beyond the older methods of the oral or written word.

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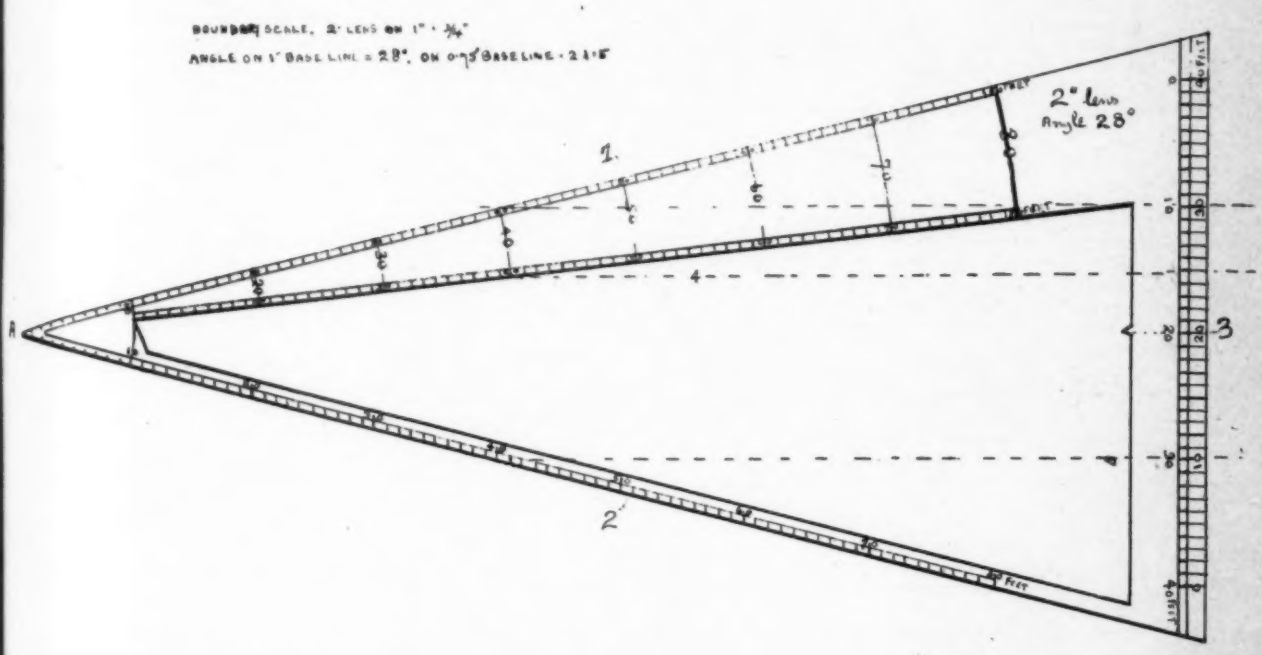
Bobby Newhard, A.S.C., doesn't like the snow stuff.

A Boundary Scale for the Motion Picture Studio

By Dr. Alfred B. Hitchins, F.R.P.S., F.R.M.S.
Member of Soc. Motion Picture Engineers

IT is desirable to know how much of any particular set will be included in the field of view at any given distance and with any given lens. For instance, will the balcony high up in the set be cut off or properly included? Will the high lefthand window be partialy cut off or properly shown? Is the descending stairway placed so as to be properly included in the foreground? It is true that these things can be determined by trial and error, but it has frequently happened that badly proportioned sets have been designed so that when the camera is placed at normal working distance important details were beyond the field of view. By moving back it would, of course, be possible to include more of the set, but then an out-of-proportion effect arises between the relative size of the players and their background. It is such an easy matter to determine before-hand how much of an existing set will be included or, when designing a new set, to create it with a knowledge of just where all important details should be built in so as to be properly included at normal taking distance with a lens of any particular focal length. The boundary scale illustrated in Fig. 1 is simply a practical application of the laws of triangulation which can be used without calculation. The size of the motion picture is 1" x ¾", and a 2" lens calculated to the 1" horizontal base line will embrace an angle of 28°; on the ¾" vertical—an angle of 21.5°. The scale illustrated is a combination of these two angles. a is the vertex of the angles. 1 and 2 represent the angle included on the 1" horizontal base line and 4 and 2 represent the angle included on the ¾" vertical line. 3, the side opposite the vertex, shows the width of set covered for any particular distance. It is



	View Embraced (Baseline and vertical in feet) at various distances.																		Distance Ratio for same sized image.	Angle of View	
	5'		10'		20'		30'		40'		50'		60'		70'		80'				
Focal Length in Inches	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line	1" Base Line	¾" Vertical Line		1" Base Line	¾" Vertical Line
1⅝	3	2·3	6	4·6	12	9·2	18	13·8	24	18·4	30	23	36	27·6	42	32·2	48	36·8	1·00	34·5°	26°
2	2·5	1·87	5	3·75	10	7·5	15	11·25	20	15	25	18·75	30	22·5	35	26·25	40	30	1·35	28°	21·5°
3	1·66	1·25	3·33	2·50	6·66	5	10	7·5	13·4	10	16·66	12·5	20	15	23·33	17·5	26·4	20	2·00	14°	14·5°
6	·833	·625	1·66	1·25	3·33	2·5	5	3·75	6·7	5	8·33	6·25	10	7·5	11·66	8·75	13·33	10	4·00	10°	7·5°

Fig. 2

only necessary to lay a straight edge from any distance on the scales 1 and 2 so as to follow straight through and cut the width scale "3" at the two sides, then subtract the amount ruled off on the two sides from the 40-ft. total scale. The remainder represents the width in feet of the set covered at the chosen distance.

Fig. 2 shows in tabular form the horizontal and vertical dimensions embraced by lenses of different focal lengths at distances varying from 5 feet to 80, also the camera or lens distance ratio for same size images with lenses of different focal length and the angles of view included with the different lenses.

It will be seen that 40 feet away with a 2-inch lens, a set 20 feet wide x 15 feet high is included, and all these distances or intermediate distances can be read directly from the scale by ruling off with a straight edge as previously described.

Fig. 3 shows the application of the scale when designing a set. The horizontal boundary lines represent the angle of view included by a 2-inch lens on the horizontal base line of 1 inch. It is, of course, presumed that this line exists at the floor level. These lines are obtained from the outer scales of the rule. The dotted line marked "Vertical Boundary Lines" are plotted from a vertex point which is removed from the vertex of the horizontal boundary lines in proportion to the height of the lens from the ground. This probably will average 5 feet and the vertex is therefore plotted 5 scale divisions apart from the horizontal boundary line vertex. The angle included by these vertical boundary lines is obtained from the 4 and 2 scales of the rule and its point of origin is, of course, at the lens.

Now, if a straight line is drawn, equally dividing the horizontal boundary lines, this becomes the ground or floor line, and where the lower vertical boundary line cuts, this is the point at which the floor first appears in the picture. Parallel with this ground line is drawn the ceiling line, and the separation of the two will depend upon the height of the studio, then the top vertical boundary line where it first cuts the ceiling line shows directly the available head room.

From such a diagram it can be calculated just what details of any particular set will be included at any distance from the lens. The scale is most conveniently made up so that ¼ of an inch on the scale divisions equals one foot and should be constructed of thin brass. A scale must be constructed for each lens of different focal length. The scale, of course, will not vary due to differences in focal length, but the outer and inner angles will change with focal length. As the focal length increases the angle included will become less.

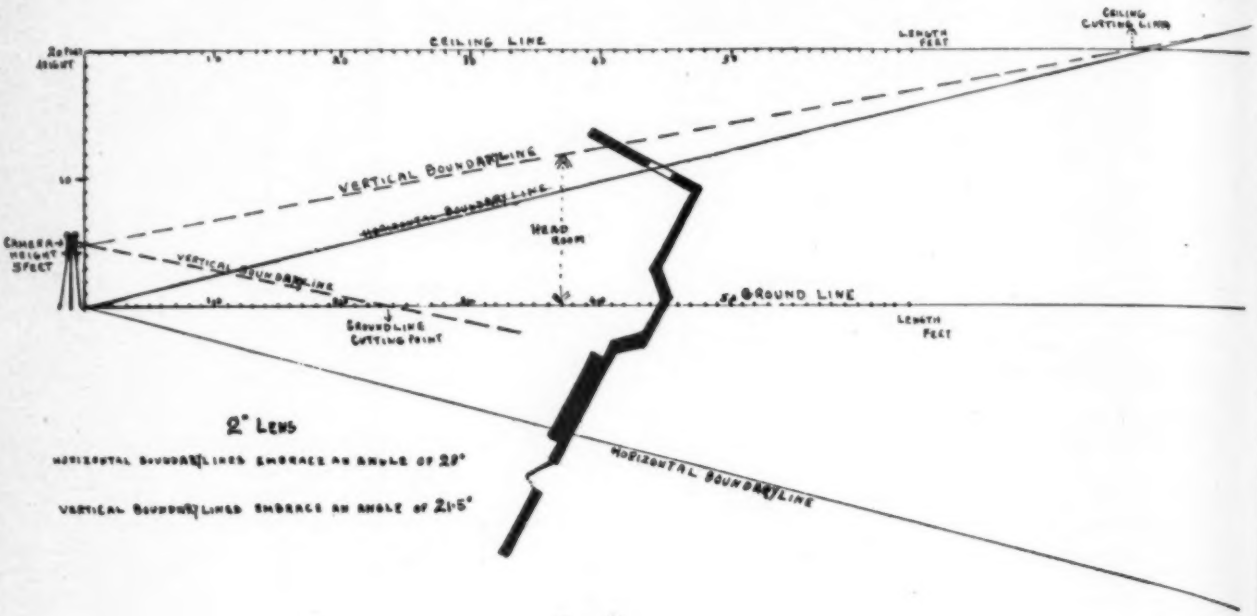


FIG. 3

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Art and the Moving Picture

By William Lee Woollett

Living as we do in an age of rapid-fire kaleidoscopic change, radio activities which presume to bring pictures thru the air and a new art in literature and music and the drama, to say nothing of the art of painting, which just now exhibits the painter as a psycho-analogist—in view of all this we may be excused perhaps for expecting the moving picture business to become (along with the barbering and the tailoring and mural decorating and architecture,) an expression of the art impulses of the community—soon—all at once.

But upon consideration we realize that art impulses which result in permanent forms of beauty mature slowly, imperceptibly, over considerable periods of time, and also that they mature only in civilizations which express a certain homogeneous quality. To look for a mature picture-art, when the art of the world is in chaos and when the forces of civilization are in a state of flux, is of course unjustifiable. On the other hand the little corner of civilization as expressed by the moving picture world, the producing end, and the public or receiving end is of sufficient mass to enable a survey of the possibilities and to justify some generalizations.

To begin with I think of the great proverb "Know thyself." We appreciate that the receiving end—the great public for whom pictures are made—represents in intelligence, according to the psychologists, the grade of a twelve or fourteen-year-old child. The picture-art, which shall last and be approved as our very own, must evidently be an art which shall appeal to this grade of intelligence; for the industry of moving pictures, to live must live thru the support of its clientele in the commercial sense and not thru the ideals expressed at the producing end.

But the situation is not so bad as it looks. There are many wonderful and beautiful things which the child intelligence apprehends and which are often unfathomed by the adult mind and the adult whose intelligence refuses to pass beyond the age of innocence, retains to a great extent the elemental characteristics of childhood in these wonderful and beautiful phases. I refer to the heritage of the race which exhibits itself in the reflexes of the subconscious mind. The child mind is more consciously awake to the impulses of instinct and heredity.

I once asked a lady friend who had just motored from San Francisco to Los Angeles how she enjoyed the giant sycamores along the road just beyond San Luis Obispo. She said that she had seen no trees on the way. How many children would not only have seen those giant and gaunt arms cracking their way thru the moonlight but other things as well. "In the soul of the child is the fate of the race."

It is our modern system of education, the force-pump method unimaginative, plain plaster walls, no out of doors variety and contact with our mechanical civilization which depletes and reflects these powers and makes of us an educated husk in which a shriveled kernel, the soul, exists.

A lecturer on the dramatic art once said in my presence, "The dramatic sense develops at a very early age in children." I thought young art is killed at an early age, thru the failure of our form of civilization to nourish.

The new art in general is an attempt to appeal to the subconscious values. These, the child mind apprehends more readily than the adult. Therefore, in this new realm of art the moving picture may find a successful future. Unfortunately for a try-out of this idea, the destinies of the moving picture business are cancelled by formalities quite removed from the fourteen-year-old average of intelligence. These colossi of modern business are not only, perhaps, but really, among our greatest commercial entities. Just how to span the chasm, just how to persuade the mechanical and industrial intelligence of the age, to co-ordinate with this fourteen year old intelligence of the masses is the problem.

We may justly expect that art with its subtle power to please may come in to solve the problem. In the moving picture entertainments we have form and color, motion and music—combined. Thru this multi-value vehicle, the artist who has command of these subconscious values may express his thoughts to the subsconcious minds of the masses.

Realism is now and perhaps always will be chief vehicle for carrying the message, but the artist, the great artist still has uncovered mines before him in this field. Events wait on the advent of an intelligence sufficiently poised to apprehend the real problem, and to solve the riddles.

Art and architecture has been dead for centuries—except in spots, of course. Why, because there have been none in the world of sufficient intelligence to analyze the relation of the mass intelligence to the laws of beauty.

First of all let us not forget that all mankind loves a beautiful flower, beauty in a human being, beauty in the world, and that no human being matures thru art impulses in the mind or the spirit, in the midst of discord, or ugliness or dirt of any kind moral or physical.

Art is nothing more or less than "pleasurable sensation" "standardized," tabulated, organized. Forms, combinations of color, actions on the stage become art when sufficiently organized into a system so as to appeal to a paying majority. Art is like a sound in the forest; without the ear there is no sound; without a public to vibrate in answer to the artist's appeal there is no art.

Therefore, artist, standardize your appeal so that this fourteen-year-old adult child of the masses may understand you. You do not stultify your art to "come down" to the people. In "coming down" to meet the public you are in reality "coming up" to the greatest thing in the world, the unspoken, unseen, unheard instincts of the race. No one knows what these are at any moment in history. Occasionally a genius gets the message and speaks the language, and then the people are saved for a space.

Listen therefore to the voice of the public, and while you listen get yourself in tune with the infinite truths which are those that are shared by all mankind.

Jackson Rose, A. S. C., has been assigned to Director Irving Cummings at U. for the filming of "Exiled," a South Sea society drama. Gladys Brockwell, Mahlon Hamilton, Stuart Holmes and Kate Price are in the cast.

TITLES ART BACK-GROUNDS

H.C. Jacobsmeyer Co.

HOLLY 482

Reggie Lyons, A. S. C., has returned from Oklahoma, where he was to have filmed a production of "Uncle Tom's Cabin." Reggie said that the production was given up for fear that there wouldn't be enough ice in the Arkansas River this summer to shoot the Eliza-crossing-the-Ohio stuff.

Ben F. Reynolds, A. S. C., famous cinematographer of "Foolish Wives," has joined Director Robert Thornby, at the Robertson-Cole Studio. Who will keep Von from breaking up all the canes in the world now that Ben has left him?

G. R. Dexter, attorney for the A. S. C., has opened a beautiful suite of offices in the new Security Trust and Savings Building in Hollywood, Cahuenga and Hollywood Boulevard.

"The Story of the Motion Picture 65 B. C. to 1920 A. D," by Ben J. Lubschez, is an attractive little book that is handy for any motion picture worker to have around. Mr. Lubschez tells of the beginnings of the cinema in a simple, straight forward narrative and he has collated a lot of most interesting matter that may not be found in other books. It is published by the Reeland Publishing Co., Inc., 727 Seventh Avenue, New York.

Now that "Be kind to animals week" has been observed why not have a "Be kind to the movies week?

Henry Ford has written his biography and, of course, it's an auto-biography.

Harry Brown, for many years chief of the electrical department of Universal, has gone to Metro in the same capacity. Mr. Brown assumed his new duties on May 22.

J. A. Dubray, A. S. C., is filming a new Doris May picture under direction of William A. Seiter, at the R-C Studio. He will finish about June 15.

Ernest S. Depew, A. S. C., has just finished the cinematographic work on a new Al St. John comedy for Fox. Al directed himself. One of the features of this picture will be some clever underwater scenes with a whale.

Virgil E. Miller, A. S. C., finished "Come Through," a crook drama, for Universal about the middle of May. Jack Conway directed and Herbert Rawlinson starred.

Frank B. Good, A. S. C., recently finished "Lights of the Desert," starring Shirley Mason, for the Fox company. Harry Beaumont directed. In this picture Mr. Good had an opportunity to show his versatility in catching the subtle moods of the desert.

Tony Gaudio, A. S. C., is filming "East is West," the new J. W. Schenck production starring Constance Talmadge. Production began May 16, and will continue until July. In the picture Mr. Gaudio will shoot a lot of unusual Chinese atmosphere.

H. Lyman Broening, A. S. C., is assisting Chief Cinematographer Charles Rosher in the photographing of Mary Pickford's big production of "Tess of the Storm Country."

Gilbert Warrenton, A. S. C., has gone to New York to photograph Alice Brady in a big production to be directed by Joseph Heneberry.

Steve Smith, Jr., A. S. C., has just completed "Gamin Girl," a Vitagraph feature starring Alice Calhoun and directed by David Smith. Steve is a busy boy.

P. Powers Perry, A. S. C., is still at Oxnard where the sugar beets grow, but he isn't shooting sugar beets.

Director Phil Rosen, A. S. C., of the Famous Players Lasky staff having completed his picture with Betty Compson, has been assigned to direct Rudolph Valentino in "The Young Rajah."

Reggie Lyon's, A. S. C., has signed as chief cinematographer with Miss Grace Haskins who will soon begin production, at the R. C. Studio, of a story of her own authorship.

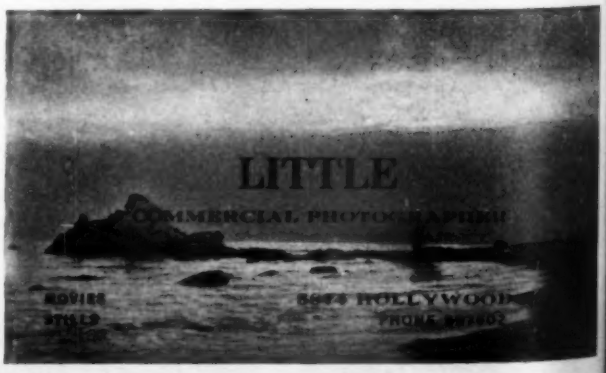
Floyd Jackman an A. S. C.

G. Floyd Jackman is now an A. S. C. He was passed by the Board of Governors of the A. S. C. February 20, 1922.

Mr. Jackman is a brother of Fred W. Jackman, president of the A. S. C. and he has had six years experience in cinematographic work.

During his service at the crank he has been connected with Warner Brothers, Doubleday Productions, Fox Film Corp., Mack Swain Comedies, and has been with Keystone for two years. His present connection is Warner Brothers, with Director Chaudet.

"The Ranger," "Blue Blazes," "Behind the Mask," "Silver Spurs" and "Shot Down," Doubleday productions; "Elephants Night Mare," Fox; "Skeleton in the Closet," Mack Swain; "Back to the Kitchen," Sennett; and other Mack Sennett comedies too numerous to mention during two and a half years there. "All in the Air," "Lost in Traffic," "That Night," Edwin Frazee; "The Storks Mistake," Wm. S. Campbell; "Pay Day" and others for C. L. Chester Comedies; "Boomerang Justice," Russell; and a serial, "Wonders of the Jungle," with Grace Darmond, for Warner Brothers.



Announcement

With the July issue the complimentary list of The American Cinematographer will be discontinued.

The Magazine of the A. S. C. has won its place so quickly and is now in such demand that a complimentary list can no longer be carried.

The July number of The American Cinematographer will carry a stamped and addressed post card which readers, not subscribers, are requested to sign and return to this office in order that they may not miss the August number.

The American Cinematographer takes this occasion to thank its many friends for their cordial support and encouragement and promises to spare no pains to merit same in the future.

The American Cinematographer

Goff's "Area" High Power Lamp

By W. T. Thomas

WITH the first luminous spark of artificial light, came a declaration of uncompromising war against that arch enemy of civilization, darkness.

Persistent developments in photography created additional demands for more and more light and, while it is not claimed that these demands have been satisfactorily met, yet the effort has been made, with resultant improvement in lighting facilities. And to this fact may be accredited, in some measure at least, the remarkable achievements of the motion picture men.

The world is most insistently calling for industrial motion pictures. The making of industrial film requires large areas of illumination, a flood of actinic light that will reach into the far corners of extensive manufacturing plants, and paint the picture of the world's activities.

The greatest need of progressive photography today, is a portable light of the highest possible intensity.

"For every hour, there is a man;
For every need, there is a plan."

Not yet, perhaps, in all its fullness, but soon. In fact we have, already, the promise, and that promise is guaranteed by the integrity, the loyalty and the genius of one whose ripening years bid fair to fulfill the promises of a brilliant young life, long since dedicated to the exacting requirements of scientific photographic exploration, Mr. Daniel J. Goff, the inventor and sole owner of Goff's New "Area" Lamp.

The writer recently had the pleasure of interviewing Mr. Goff on the subject of his new lamp. He was found hard at work in his laboratories at No. 3159 Indiana Avenue, Chicago, where he spends most of his working hours, and dreams most of his dreams.

But his personality is not at all dream-like; on the contrary he seems to bubble with enthusiasm and talked freely and willingly on the subject of his "latest and greatest achievement."

Every statement of fact contained in this article may be relied on as coming from the inventor and manufacturer, himself, and, as nearly as possible, the following description will be given in his own words:

"It has been demonstrated that my light has a longer throw, greater volume, higher actinic quality, and consumes less current than any portable light that has yet been developed.

"An important feature is the parabola reflector, which is twenty three inches in diameter, made of spun copper with a triple silver-plated surface. In this egg-shaped reflector, exactly in the center, are focusable carbon holders and, because they are focusable, the operator is able to supply either "flood" or "beam" light, at will.

"The arc, proper, is a hand feed, with adjustable screws for tilting or centerng, either vertically or horizontally. The lamp-head and reflector are one unit, and may be tilted either vertically or horizontally, and is detachable by a thumb screw. The head may be raised to a height of twelve feet from the floor.

"In front of the reflector is mounted the holder for the diffusing screens, which are composed of quarter-inch plate ground-glass, wired to prevent breakage, and to hold the glass together.

"Next to this is placed a satin-finished gelatine screen which breaks up the intense beams, and gives a soft, pleasing light of just the right intensity for close-ups.

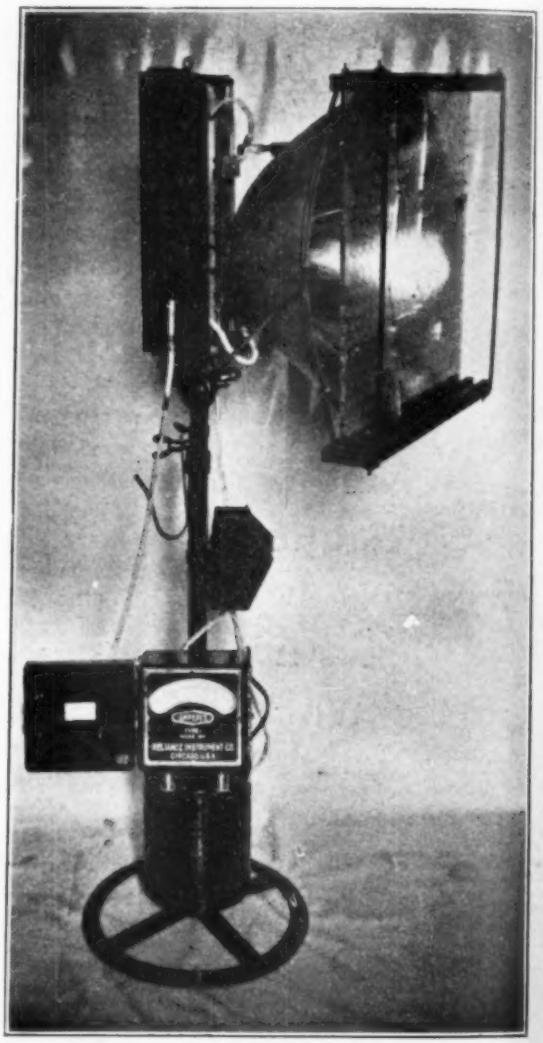
"In a recent demonstration (with eight of these lamps) in Danceland (a hall 145x105 feet) perfectly timed exposures were made with a motion picture camera and f/3.5 lens, with regular E. K. negative stock. All corners of this immense area were fully lighted, and the test very satisfactorily demonstrated the superior efficiency of my lamp.

"A prominent lighting engineer of Chicago recently made photometer tests of my lamp, and found that it developed two million beam c. p., at a distance of fifty feet, and at a distance of four feet a cigar was lighted with ease.

"It is very well known among lighting engineers that the hand-feed arc is more efficient, both as regards quantity and quality of light produced, and in the present instance I cannot put too much stress on the statement that with my lamp it is possible to get just the right wave-length to produce the greatest chemical effect upon the photographic emulsion.

"The amperage draw is thirty-seven and a half amperes per unit, and the lamps operate on 110 or 220 volts, d. c. or a. c.

"I have designed a special rheostat winding, with special heat resisting material, and when the arc is



struck (after a period of thrity-five or forty seconds) the induction of the current automatically cuts off a number of coils, and this operation serves as a starter whereupon, after a fraction of a minute, the arc receives its full efficiency in load and no line drop is noticeable, whatever.

"Every camera man knows that the ordinary open arc loses much light in all direction, and the "throw" is very limited; but, with the "Area," you put the light where you want it and distances of two hundred feet can be covered with ease and with very satisfactory results; while as a spot-light, having no lens and being readily focusable, it has no superior.

"The base is mounted on roller casters, and the entire lamp, complete with diffusers, weighs only seventy-six pounds."

Now, not only advice, but also criticism, is very cheap; in fact they are a drug on the market, and comparisons are always odious. For instance:

There is a lamp on the market (and it is a very good one) for which it is claimed that: "The light distribution is very uniform in all directions within the large angle of 130 degrees." And: "A candle power of 100,000 is maintained throughout the entire field illuminated."

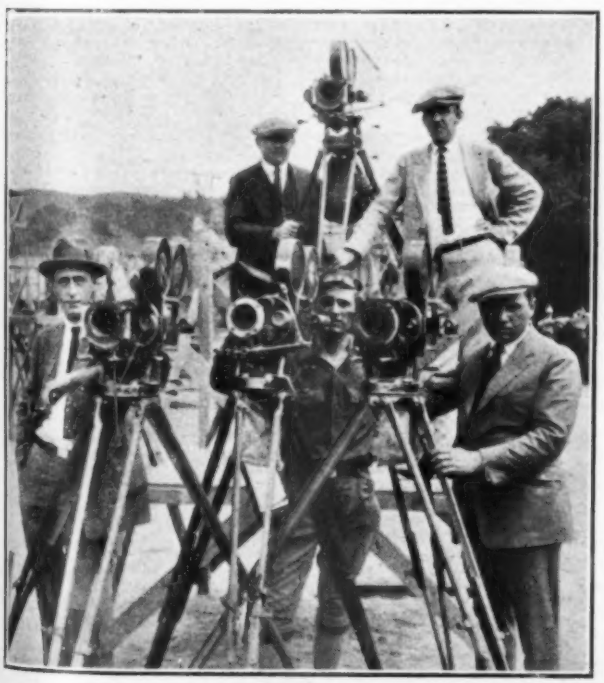
If I cared to comment on the above statement, I might say that the sun, itself, is accredited with only 800,000 c. p. **to the square inch;** which means, not 800,000 c. p. at **all points,** or at **any one point,** but that 800,000 c. p. is distributed over the surface of 1 inch square.

But this kind of a discussion is very uninteresting, and is profitable only in that it brings out the fact that it is not technique, but results, that are of real value to the world.

There is unquestionably a tendency among lamp makers to cloud the question of candle power, as witness the many remarkable statements issued concerning mean horizontal c. p.; average c. p.; mean spherical c. p.; beam c. p.; flux; lumen; brightness, etc., but after all, what does it matter as the rating of an arc lamp must, in the final analysis, be based on either the intake in watts, or the output in light.

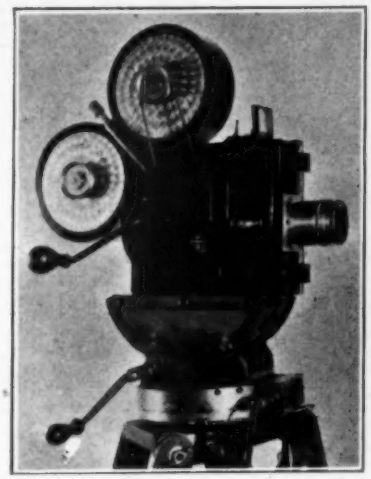
What the industrial film producer wants today is a portable lighting system that will successfully and satisfactorily illuminate large areas, and enable him to record the actual operations of large manufacturing concerns, etc.

A service truck equipped with twenty "Area" lamps, ready to go anywhere, at any time, and prepared to deliver a volume and quality of light that no other portable lighting system yet developed can deliver—that is something concrete, something that the motion picture world will understand and appreciate. And then the service truck is accessible to all reputable industrial film producers, and the service includes an inflexible guarantee of more and better light, or money back, which guarantee is supported, not only by a satisfactory commercial and financial rating, but also carries the weight of Daniel J. Goff's name.



On the platform are Director Tod Browning and Billy Fildew, A.S.C. In the trenches are Phil Whitman, Virgil Miller and Jackson Rose, all A. S. Cs. They are lined up to get some special stuff in "Under Two Flags" Universal's current production featuring Priscilla Dean.

The New Wilart Camera



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Evolution

BY JOSEPH A. DUBRAY, A. S. C.

The TURNING POINT of our Industry!

How much we have heard of it! How anxiously we have been waiting for it!—The turning point which will mark the end of the chaos through which we have been wandering, and the beginning of an era of sound success, based upon logically handled enterprises.

The squandering of capital and the waste of time which have been predominating all through the craze of production, during and immediately after the war, is a thing of the past.

The fight against arbitrary censorship, gallantly carried on, is gaining in our favor, because it is becoming less sectarian.

The panic and subsequent crisis, which have prevailed during the past months, are slowly but surely disappearing.

Capital begins to loosen up, and if the theatres throughout the country are not patronized as much as they were during the past few years, we can with optimism look forward to an increase of business, running parallel with the settlement of the financial conditions of the whole country, which settlement is fast approaching, according to public statements recently made by some of the most authorized personalities of the United States.

We have reached the turning point, and from now on, the industry will go straight forward, towards its higher destinies.

It is interesting right at this time, when we have to concentrate all our strength and faith in future successes, to glimpse backwards to the difficult road through which we have been struggling, and gather renewed confidence and hopes, in considering our accomplishments, as well as the lesson we can derive from our past faults.

In the early days, when pictures were more or less in their experimental phase, and their success a mere success of curiosity, producers confined themselves in an output more suitable to please the less refined classes of society, as if mislead by a lack of confidence in the future of the industry they were founding.

To the credit of some of these same producers, is the honest effort of taking advantage of the educational possibilities of motion pictures, and the attempt of putting their resources (technical, mechanical and financial), at the disposal of science.

Many reels of purely scientific subjects have been "cranked" and appreciated by scholars and students, but seldom by the public at large, because of their dryness and incomprehensibility of the uninitiated.

These two extremes of production, the hair raising melodrama or vulgar farce and the purely scientific subject, were to be linked together by the production of today, which bears entertaining qualities proper to amuse and interest any class of people, together with an undeniable educational value.

The role of the cameraman of the early days, was practically the role of any toiler. Little effort of mind was required from him, his work being then more mechanical than intellectual.

Those were the times when the cameraman had to punch the clock-card at the entrance of the studio, when his wages were computed by the hour of presence at the studio, his weekly check a mere meal and lodging ticket, and his personality or prominence, brought forward only when displaying unusual coolness and nerve control, in some of the "stunts" he had to perform while filming the obsolete melodramas in vogue in those days.

But the cameramen of the early days had faith in the future and did foresee the possibilities inherent in their trade, and slowly but surely they walked on with progress, they helped the producer with their enthusiasm, they dug up all their skill, and their efforts and study and energy have done more for the upbuilding of the industry than any other creative body connected with it.

The evolution of the motion picture cameraman was finally recognized by the producer, his responsibility better acknowledged and financially better rewarded.

And here starts the era of real co-operation between the most important factors of the making of a motion picture production. The efforts of author, director and cinematographer, combined by mutual consent, brought forth results which stand as a credit to their personalities in the upbuilding of the technicalities of screen productions.

In any kind of production, drama, melodrama, comedy-drama or slap-stick comedy, the association between director and cinematographer, bringing both to a mutual understanding of each other's problems and wantings has always proved to be a success in technical achievements.

Director and cinematographer form together the pivotal point upon which turns the fortune of a production, and together share the responsibility of making a picture a success or a failure artistically as well as financially.

The cinematographer is now-a-days a recognized **creative** entity; he is cultured, studious, has high moral and artistic ideals; and by his intelligence he has gratified the screen with many remarkable achievements.

The work of the cinematographer is complex.

Not only good photography is required from him, but also an artistic personality, a good knowledge of dramatic construction, and of the psychological value of the graphic presentation of a dramatic or comical situation.

This work cannot be considered as "labor," but by its nature, the responsibilities inherent in it, the mental effort required to carry it on successfully, classes it among **professions**, and it should be remunerated accordingly.

There is a tendency, which becomes more and more evident, among producers, even within big producing corporations, to consider each picture as a **"unit,"** destined to live its own life, therefore to bring forth a financial gain or loss.

The first consequence of this purely financial arrangement is the suppression of the spectacular production, the cost of which is superior to its box office value, and its worth based more upon its advertising possibilities than upon the returns which may be expected.

We cannot question here, if the entertaining qualities of these pictures are sufficient to justify the great expenditure involved in their production, or if they are a real help in "putting over" minor productions bearing the same trade-mark, as well as we cannot question the advisability of such business method.

The matter which is of interest to the cinematographer is that by the new arrangement all pictures spectacular or not, costly or cheap to produce, **must** bring back returns proportional to the investment made by the producer.

The second consequence is the absolute necessity for the producer to estimate the cost of the production and possible returns as closely as possible in order to reduce to a minimum the chances of a financial failure.

The cost of a production is always, of course, estimated by the producer at a minimum, and submitted to the director whose duty is to keep as close as possible to the given figure.

The mechanical end of the production can quite easily be estimated, referring mostly to material (sets, properties, costumes, etc.) and labor.

The expenditure for the cast and the salaries or director and cinematographer are factors which can be computed only if the limit of **time** in which the production is to be completed is closely adhered to.

The **limit of time** is the unknown factor which can increase the cost of a production to a prohibitive figure.

It is obvious that every member of a producing **unit**, director, cinematographer and cast, is personally interested in the artistic success of the picture itself, because it will cast credit upon himself for future references, but the interest in the financial success of the production seems to need stimulation.

How can a producer encourage the **time-saving** spirit of a whole organization if not by making it materially profitable to all interested in it?

The percentage system adopted by some companies has proved a failure, mainly for the too long lapse of time before the production brings back full returns.

The "bonus" system is partial and therefore unpopular.

Remains the system which seems to become more and more a business possibility, consisting in a **liberal remuneration to director, cinematgrapher** and **cast,** independently of the **time** spent in completing the production.

This remuneration can be considered as **a professional fee** paid to the principal co-makers of a motion picture production.

The cinmatographer deserves and wants moral and material recognition. Will the professional fee system grant him both? Only the future and an honest application of the system will answer the question.

It is the burden of the cinematographer to work with untiring enthusiasm and faith in the creative spirit which he always displays. It is a burden to constantly struggle against odds and ends which assail him at almost each turn of the "crank." This burden the cinematographer carries lightly because he is conscious of the importance of his contribution to the screen and because of the sincerity of his efforts. Let his efforts be remunerated with equal sincerity, and the industry will once more lead the way towards emancipation and set an example of honesty of purpose and good will.

We are evoluting morally and professionally, let us evolute materially.

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Gray, King D.—
Griffin, Walter L.—with Warner Brothers, Warner Studios.
Guissart, Rene—In charge of Photography, Harley Knoles Productions, London.
Heimerl, Alois G.—Victor Schertziner Productions, Santa Barbara.
Hill, George W.—
Jackman, Fred W.—Supervising Cinematographer, Mack Sennett Studio.
Jackman, Floyd—Lester Cuneo, Fine Arts Studio.
Klaffki, Roy H.—Director of Photography, Metro Studio.
Kline, Ben H.—
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Kull, Edward—Directing Russell Studio.
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Landers, Sam—
Leezer, John—Gen. Manager World Classics Film Corp.
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Lyons, Chester A.—International Studio, New York.
Lyons, Reginald E.—
Mackenzie, Jack—with Chester Bennett, United Studios.
MacLean, Kenneth G.—Century Comedies, Century Studio.
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McGann, William M.—
Miller, Virgil E.—with Universal Studio.
Milner, Victor—Universal Studio.
Morgan, Ira H.—with Robert Vignola, International Sutdio, N. Y.
Newhard, Robert S.—Nell Shipman Productions, Spokane, Wash.
Norton, Stephen S.—
Overbaugh, Roy F.—
Palmer, Ernest S.—London.
Perry, Paul P.—with Penryn Stanlaws, Lasky Studio.
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Polito, Sol—
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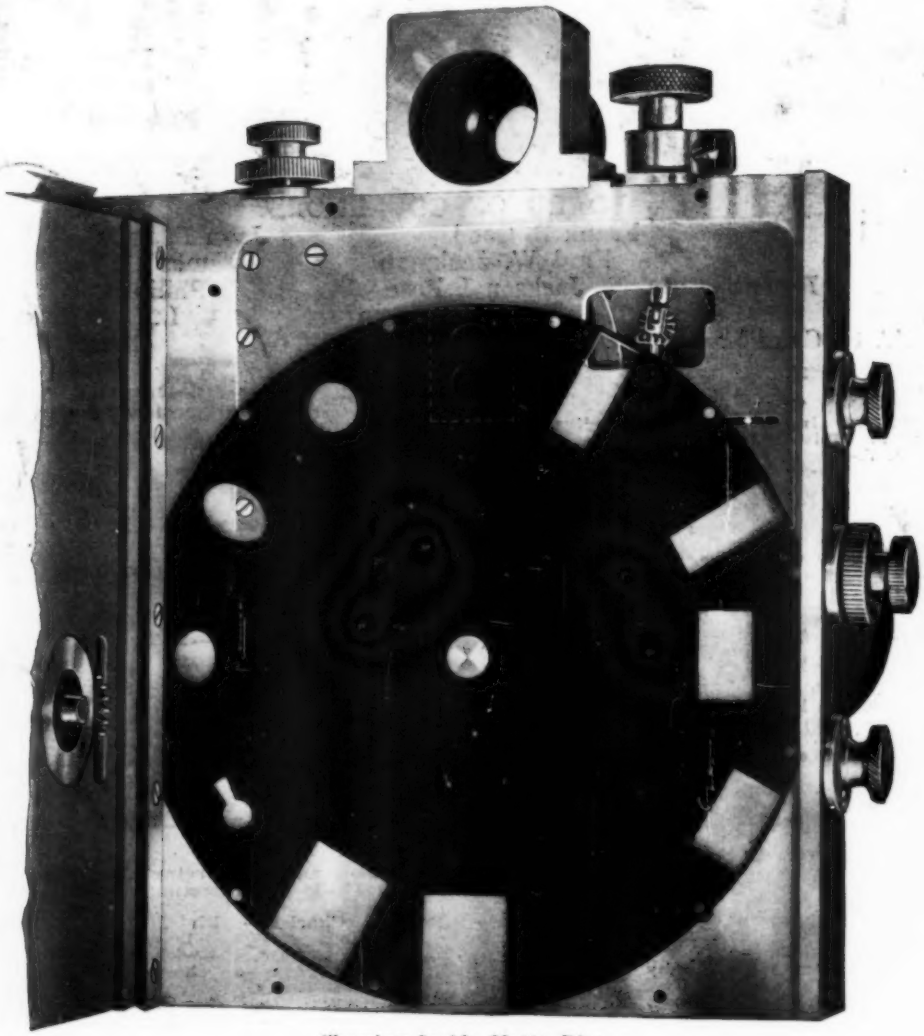

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